<center>Remarks</center>

Claims 1-12 and 14-16 are pending in this application. Applicants have amended claims 1-12 and 14-16 to clarify the claimed invention. Applicants respectfully request favorable reconsideration of this application.

Applicants have amended the claims to clarify the invention and to insert "wherein" in claims 5 and 6. Accordingly, Applicants respectfully request withdrawal of the objection to the claims.

Applicants have amended claims 14-16 to depend from claims 1, 9 and 12 to further clarify the system, method and computer program product recited therein. Applicants have amended claims 1, 2, 9, and 10 to clarify the structural relationships among elements of the claimed invention. The system and method coordinate movements among a plurality of mechanical units. Therefore, the claimed invention results in useful, tangible and concrete results. Applicants submit that claims 1, 2, 9, 10, and 14-16 comply with 35 U.S.C. § 101. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 101.

The Examiner rejected claims 1, 4, and 9 under 35 U.S.C. § 112, second paragraph, as indefinite. Applicants have amended claims 1 and 9 to clarify the structural relationships among elements of the claimed invention. Applicants have amended claim 4 to delete the phrase identified by the Examiner. Accordingly, Applicants submit that claims 1, 4, and 9 comply with 35 U.S.C. § 112, second paragraph, and respectfully request withdrawal of this rejection.

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The Examiner rejected claims 1, 2, 9, 10, 12, and 14-16 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent publication 2003/0220715 to Kneifel II et al. The Examiner rejected claims 3 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Kneifel II et al. in view of U.S. patent 5,254,923 to Kanitani. The Examiner rejects claims 4-8 under 35 U.S.C. § 103(a) as being unpatentable over Kneifel II et al. in view of Kanitani and further in view of U.S. patent 6,004,019 to Suita.

Kneifel II et al. does not suggest the invention recited in claims 1, 9, or 12 since, among other things, Kneifel II et al. does not suggest a system, method or computer program product that include a path planner adapted to receive instructions from at least two of said mechanical unit programs and based on the instructions determine how the mechanical units should move in order to synchronize their movements. The claimed invention permits a program to be interrupted and move or jog one mechanical unit independently of other mechanical units to perform maintenance or repair work, for example. When the maintenance or repair work, for example, has been carried out, the mechanical unit, which was moved independently, typically is brought back into the position and to regain the same status it had prior to being moved independently. In other words, the mechanical unit typically is returned to the same path level, so that it can continue to work synchronously with the other mechanical units.

Unlike the claimed invention, Kneifel II et al. suggests a robot control system including a plurality of robot controllers, each controller controlling one robot. The robot control system includes a remote instruction source that supplies motion control commands to the robot

controllers. The object of Kneifel II et al. is to make it possible to dynamically exchange control of a given robot between various control programs running on different controllers. This makes it possible for the robots to work independently, when each robot is controlled by its own control program running on its own robot controller, as well as coordinated with other robots when the robots are controlled by a single program. Thus, when the robots are about to work independently the robot are controlled by a plurality of separate control programs and when they are about to work coordinated they are controlled by a single control program.

If movement instructions are provided by a single control program as in Kneifel II et al., it is not possible to interrupt the program and move one of the robots independently of the other robots and then to continue with the synchronized movement. Such a single general control program also has to be rewritten every time the work, or the mechanical units of a system are changed, for example when a robot is added to the system. Thus, it is desire to have a separate control programs for each mechanical unit, also when the movements are to be synchronized.

Kneifel II et al. also does not suggest a switching unit adapted to switch a mechanical unit program from one path planner to another, whereby movements of the mechanical units are synchronized when their mechanical unit programs are connected to the same path planner and the movements of the mechanical units are independent when their mechanical unit programs are connected to different path planners. The movements of two or more mechanical units may be operated in synchronous cooperation by connecting their control programs to the same path planner. The mechanical units may be operated individually by connecting them to different path planners.

On the other hand, Kneifel II et al. suggests a control system including a plurality of control units, each control unit including a motion manager 62 and a path planner (a real time planner 64 and an interpolator 66) as shown in Fig. 5. The motion manager serves as an arbitrator. If the arbitrator receives motion control commands from more than one control program, it mediates the operating state of the motion system, such that only the appropriate commands are acted upon by each of the robots. Thus, the path planner will only receive instructions from one control program at a time.

Furthermore, Kneifel II et al. does not suggest a path planner adapted to synchronize movements of two mechanical units. In particular, Kneifel II et al. does not suggest a path planner that is adapted to synchronize movements of two mechanical units based on instructions received from at least two separate mechanical unit programs. Rather, Kneifel II et al. suggests coordinating synchronized and independent movement by exchange of control between control programs. The movements of two or more mechanical units are operated in synchronous cooperation by executing a single control program. The mechanical units are operated individually by executing two or more separate programs in parallel on different control units.

The claimed invention makes it possible to have separate control programs for each mechanical unit and to synchronize the movements based on program instructions in more than one program, without using a master-slave solution. By switching a control program from a first path planner to a second path planner, a mechanical unit can easily switch between independent and synchronized movement during execution of a control program. Due to the fact that the

synchronization status is local to each of the involved path levels, the mechanical unit may take up the same position and status as when its program was switched from a first path planner to a second path planner.

Another advantage with the present invention is that it makes it possible to use one single controller to control the movements of a plurality of mechanical units in independent operation as well as in synchronous operation. Having one single controller instead of a plurality of controllers reduces cost. Kneifel II et al. does not suggest such a system.

In view of the above, Kneifel II et al. does not suggest the invention recited in claims 1, 2, 9, 10, 12, and 14-16 and Applicants respectfully request withdrawal of this rejection.

The combination of Kneifel II et al. and Kanitani does not suggest the invention recited in claims 3 and 11 since, among other things, Kanitani does not overcome the above-discussed deficiencies of Kneifel II et al. For example, Kanitani does not suggest a system, method or computer program product that include a path planner adapted to receive instructions from at least two of said mechanical unit programs and based on the instructions determine how the mechanical units should move in order to synchronize their movements. Kanitani does not suggest a switching unit adapted to switch a mechanical unit program from one path planner to another, whereby movements of the mechanical units are synchronized when their mechanical unit programs are connected to the same path planner and the movements of the mechanical units are independent when their mechanical unit programs are connected to different path planners. Furthermore, Kanitani does not suggest a path planner adapted to synchronize movements of two

mechanical units. The Examiner cited Kanitani as suggesting shared memory. Shared memory does not suggest any of the above aspects of the invention recited in claims 1 and 9, from which claims 3 and 11 depend. Accordingly, the combination of Kneifel II et al. and Kanitani does not suggest the invention recited in claims 3 and 11 and Applicants respectfully request withdrawal of this rejection.

The combination of Kneifel II et al., Kanitani and Suita does not suggest the invention recited in claims 4-8 since, among other things, Suita does not overcome the above-discussed deficiencies of Kneifel II et al. or Kanitani. For example, Suita does not suggest a system, method or computer program product that include a path planner adapted to receive instructions from at least two of said mechanical unit programs and based on the instructions determine how the mechanical units should move in order to synchronize their movements. Also, Suita does not suggest a switching unit adapted to switch a mechanical unit program from one path planner to another, whereby movements of the mechanical units are synchronized when their mechanical unit programs are connected to the same path planner and the movements of the mechanical units are independent when their mechanical unit programs are connected to different path planners. Furthermore, Suita does not suggest a path planner adapted to synchronize movements of two mechanical units. The Examiner cited Suita as suggesting certain data stored in memory. Such data does not suggest any of the above aspects of the invention recited in claim 1, from which claims 4-8 depend. Accordingly, the combination of Kneifel II et al., Kanitani and Suita does not suggest the invention recited in claims 4-8 and Applicants respectfully request withdrawal of this rejection.

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In view of the above, the references relied upon in the office action, whether considered alone or in combination, do not suggest patentable features of the claimed invention. Therefore, the references relied upon in the office action, whether considered alone or in combination, do not make the claimed invention obvious. Accordingly, Applicants respectfully request withdrawal of the rejections based upon the cited references.

In conclusion, Applicants respectfully request favorable reconsideration of this case and early issuance of the Notice of Allowance.

If an interview would advance the prosecution of this case, Applicants urge the Examiner to contact the undersigned at the telephone number listed below.

The undersigned authorizes the Commissioner to charge fee insufficiency and credit overpayment associated with this communication to Deposit Account No. 22-0261.

Respectfully submitted,

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